Patricia M. French Senior Attorney



300 Friberg Parkway Westborough, Massachusetts 01581 (508) 836-7394 (508) 836-7039 (facsimile) pfrench@nisource.com

July 16, 2005

BY OVERNIGHT DELIVERY AND E-FILE

Mary L. Cottrell, Secretary Department of Telecommunications and Energy One South Station Boston, MA 02110

Re: Bay State Gas Company, D.T.E. 05-27

Dear Ms. Cottrell:

Enclosed for filing, on behalf of Bay State Gas Company ("Bay State"), please find Bay State's responses to the following Information Requests:

From the Attorney General:

AG-09-35 AG-09-54 AG-14-23 AG-15-10

From the Department:

DTE-18-25 DTE-18-26

From the MOC:

MOC-4-5 (Rev. Bulk)

From the UWUA:

UWUA-2-10

From the DOER:

DOER-1-8

Please do not hesitate to telephone me with any questions whatsoever.

Very truly yours,

Patricia M. French

cc: Per Ground Rules Memorandum issued June 13, 2005:

Paul E. Osborne, Assistant Director – Rates and Rev. Requirements Div. (1 copy) A. John Sullivan, Rates and Rev. Requirements Div. (4 copies) Andreas Thanos, Assistant Director, Gas Division (1 copy) Alexander Cochis, Assistant Attorney General (4 copies) Service List (1 electronic copy)

COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE FIFTEENTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL D. T. E. 05-27

Date: July 16, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-35 Refer to the Company's proposed tariff M.D.T.E. 34, Appendix B. Provide

a list of fees charged by other Massachusetts LDCs for the same

categories Bay State does.

Response: The Department's website lists an Appendix B for each distribution

company. Attachments AG-9-35 (a), (b), (c), (d) and (e) are printouts of these appendices that include the administrative fees and charges for the

respective MA LDCs listed below.

Attachment AG-9-35 (a) - Boston Gas Company

Attachment AG-9-35 (b) - Commonwealth Gas Company

Attachment AG-9-35 (c) - Berkshire Gas Company Attachment AG-9-35 (d) - Colonial Gas Company Attachment AG-9-35 (e) - Essex Gas Company Schedule of Administrative Fees and Charges

Company Service Fees:

Customer Fees:

Interest charges for unpaid balances: The rate of interest shall be determined annually in accordance with the MDTE regulations at 220 C.M.R. 26.00 and shall become effective each year with February bills.

Returned Check Charge: \$15.00

Account Restoration Charge: A commercial/industrial customer will be charged a reconnect charge of \$50.00 if no court-issued warrant was obtained for shutoff, or \$125.00, if a court-issued warrant was obtained. All customers will be responsible for paying the additional reconnect costs if service is disconnected at the street

Supplier Fees:

Customer Enrollment Fee (Section 24.5.9): TBD

Customer Cancellation and Termination Fee (Section 24.5.9): TBD

Bay State Gas Company D.T.E. 05-27 Attachment AG-9-35 (a) Page 2 of 2

Aggregation Pool Fee (Section 24.6.6): TBD

Late Payment Charge (Section 24.8): The rate of interest shall be determined annually in accordance with the MDTE regulations at 220 C.M.R. 26.00.

Standard Complete Billing Service (Section 14.2.1): TBD

Standard Passthrough Billing Service (Section 14.2.2): TBD

APPENDIX B

Bay State Gas Company D.T.E. 05-27 Attachment AG-9-35 (b) Page 1 of 1

Schedule of Administrative Fees and Charges

(November 1, 2000)

Customer Fe	es & Charges
-------------	--------------

Interest Charge on Past-Due Bills	Variable Rate [1]
Returned Check Fee	\$ 4.00
Account Restoration Charge	\$ 12.00
Supplier Fees & Charges	
Aggregation Pool Fee (Section 24.6.6)	TBD
Customer Cancellation and Termination Fee (Section 24.5.9)	TBD
Customer Enrollment Fee (Section 24.5.9)	TBD
Late Payment Charge (Section 24.8)	Variable Rate [1]
Standard Complete Billing Service Fee (Section 14.2.1)	TBD
Standard Passthrough Billing Service Fee (Section 14.2.2)	TBD

[1] Calculated annually in accordance with the MDTE regulations at 220 C.M.R. 26.00.

APPENDIX B

Bay State Gas Company D.T.E. 05-27 Attachment AG-9-35 (c) Page 1 of 2

Schedule of Administrative Fees and Charges

CUSTOMER FEES AND CHARGES

Non-Residential Customer Late Payment Charge Variable in accordance with

220 C.M.R. 26.00

Reconnection Charges:

Seasonal Meter Turned off for Seven (7) months or less \$30.00

Non-Seasonal Meter Restored During Normal Working Hours \$10.00

Non-Seasonal Meter Restored After Normal Working Hours \$15.00

Customer Shut-Off Via Street Lock for Non Payment* \$50.00

C & I Customer Charge For Each Gas Burning Appliance* \$ 2.00

Return Check Charge Pursuant to Applicable Bank

Charge

^{*}in addition to applicable reconnection charge

SUPPLIER FEES AND CHARGES

Aggregation Pool Fee (Section 24.6.6) TBD

Customer Cancellation and Termination Fee (Section 24.5.9) TBD

Customer Enrollment Fee (Section 24.5.9) TBD

Late Payment Charge (Section 24.8) Variable in accordance with

220 C.M.R. 26.00

Standard Complete Billing Service Fee (Section 14.2.1) TBD

Standard Passthrough Billing Service Fee (Section 14.2.2) TBD

Schedule of Administrative Fees and Charges	Attachment AG-9-35 (d) Page 1 of 2
Company Service Fees:	
Customer Fees:	
Interest charges for unpaid balances: The rate of interest shall be determined annually in accordance with the C.M.R. 26.00 and shall become effective each year with February bills.	ne MDTE regulations at 220
Dishonored Check Charge: \$10.00	
Service Reconnection Fee: \$25.00	
Meter Testing Fee: \$15.00	
Seasonal Termination/Reconnection Fee: \$20.00	
Supplier Fees:	

Customer Enrollment Fee (Section 24.5.9): TBD

Bay State Gas Company D.T.E. 05-27 Attachment AG-9-35 (d) Page 2 of 2

Aggregation Pool Fee (Section 24.6.6): TBD

Late Payment Charge (Section 24.8): The rate of interest shall be determined annually in accordance with the MDTE regulations at 220 C.M.R. 26.00.

Standard Complete Billing Service (Section 14.2.1): TBD

Standard Passthrough Billing Service (Section 14.2.2): TBD

Bay State Gas Company D.T.E. 05-27 Attachment AG-9-35 (e) Page 1 of 2

Schedule of Administrative Fees and Charges		Page 1 of 2
Company Service Fees:		
Customer Fees:		
Interest charges for unpaid balances: The rate of interest C.M.R. 26.00 and shall become effective each year with Fe		accordance with the MDTE regulations at 220
Returned Check Charge: \$15.00		
Reconnection of Service: \$12.00		
Meter Testing Fee: \$10.00		
Meter Turn On: If any adjustment of appliances is require transportation charge.	ed other than lighting pilots, the m	ninimum service charge is \$20.00 plus \$7.00
Supplier Fees:		

Bay State Gas Company D.T.E. 05-27 Attachment AG-9-35 (e) Page 2 of 2

Customer Enrollment Fee (Section 24.5.9): TBD

Customer Cancellation and Termination Fee (Section 24.5.9): TBD

Aggregation Pool Fee (Section 24.6.6): TBD

Late Payment Charge (Section 24.8): The rate of interest shall be determined annually in accordance with the MDTE regulations at 220 C.M.R. 26.00.

Standard Complete Billing Service (Section 14.2.1): TBD

Standard Passthrough Billing Service (Section 14.2.2): TBD

COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL D. T. E. 05-27

Date: July 13, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-54

Is Company in the process of negotiating any new Special Contracts? If yes, please describe the type of contract and the estimated volumes to be delivered and the revenue to be generated. Provide an economic analysis of the contract including the revenues that would be generated by this customer if it were on a tariffed rate. Include all supporting workpapers, calculations and assumptions.

Response:

The Company is not in the process of negotiating Special Contracts with any current tariffed customers or new customers. The Company is, however, engaged in discussions with one existing Special Contract customer regarding possible changes to the arrangements of providing service. The discussions with this customer have not yet led to any formal or official new or revised agreement. The Company is close to completing negotiations with this customer to modify the contractual arrangements under which the Company will continue to provide service. It is the Company's expectations that the revised arrangements will result in very similar revenues, or value to the Company, as compared to the value or revenue stream under the existing contract terms. The Company will be filing this contract with the Department for its review and approval before Bay State will be able to continue to provide service under revised contractual provisions.

COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE FOURTEENTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL

D. T. E. 05-27

Date: July 16, 2005

Responsible: Danny G. Cote, General Manager

AG-14-23 Refer to the Company's June 3, 2005, letter on the status of discovery

responses. Produce copies of all soil resistivity tests conducted by the

Company.

Response: Please see the Company's response to AG-25-6 for the available copies

of soil resisitivity tests from Bay State's Lawrence and Brockton service

areas, respectively.

See Attachment AG-14-23 (a) through (bb) for copies of the available soil

resisitivity tests from Bay State's Springfield service area.

IMPRESSED CURRENT GROUNDBED DESIGN

CHICOPEE @ TERIMAR ST

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(a) IMPRESCIPAGE 14 of 2

Resistivity:

8000 ohm-cm

ANODE DATA

MATERIAL COST

Anode Type:

Anode:

175 ea.

Anode Dia:

3 in.

Anode Cbl:

0.9 \$/ft

Anode Length:

60 in.

Hdr Cbl:

Trenching:

1.25 \$/ft

of Anodes:

10

Splice:

25

Anode Spcng Dist. Remote

12 ft. 45 ft. INSTALLATION COSTS

4.4 \$/ft

CABLE DATA

SIZE

Anode Inst:

252 per anode

Hdr Cable:

0

AWG

Splc Inst: Power Cost:

15 per splice

\$/kwh

Electric

0.1 1000

Rectifier

1100

Repairs/parts

700

Operating I:

5 amps(est)

permits/Eng.

1000

cops

0

GROUNDBED DESIGN RESULTS

Resistance:

1.52262 OHMS

GROUNDBED COSTS

Rect. Volts:

7.6 volts

Materials:

\$3,941.25

Est. Amps:

5 amps

Install:

\$7,415,20

Total

\$11,356.45

Header length

108

DRILLING

DEPTH

25 FEET

0.6431603 VOLTAGE GRADIENT AT PIPE

5 GROUND BED CURENT IN AMPS 8000 RES. OHMS/CM.

170 LENGTH ANODE IN FEET

100 DISTANCE ANODE TO PIPE OR ?

S OIL RESIS TIVITY SUR V EY & LAYER VALUE DETERMINATION

LOCATION: TERIMAR ST.

TOWN:

CHICOPEE

10'-6"

15'-8"

20'-10"

26'-1"

SOUTH TREEBELT

SOIL20.WK4

KS/GUS

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(a) Page 2 of 2

61170 | 5'3"-10'6"

19444 | 20'10"-26'1"

28347

20588

10'6"-15'8"

15'8"-20'10"

	101111	OF HOOF EE		ECONTION.	TEITHING OT.	D/III.	00///0/	TEOTER.	110/000		. ago 2 0. 2
=		==========	========	=======================================		=======================================		=======================================			========
			4 PIN DAT	A	11			LAYER	PROCEDURE		
		=======================================		=======================================	=========	==========	==========	=======================================		=======================================	
	1	1		1 1	11	1	1	R2	1	LAYER R E	SISTIVITY
	LOCATION	SPACING	R1	FACTOR	RESISTIVITY	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH
	NO.	FEET	OHMS	X	OHM-CM	MHOS	MHOS	MHOS	X I	OHM-CM	FEET
			========	= =====================================			==========				==========
	1	5'- 3"	126	1000	126190	0.0079	0.0079	126.1905	1000	126190	0"-5'3"
	1	10'-6"	25	2000	50667	0.0395	0.0315	31.6966	1000	31697	5'3"-10'6"
	İ	15'-8"	8	3000	24390	0.1230	0.0835	11.9723	1000	11972	10'6"-15'8"
	İ	20'-10"	4	4000	16092	0.2486	0.1256	7.9636	1000	7964	15'8"-20'10"
	i	26'-1"	2	5000	10870	0.4600	0.2114	4.7297	1000	4730	20'10"-26'1"
	i	NORTH TREE	EBELT					•	•	•	
	i										
	i										
	i										
	i										
	LOCATION	SPACING	R1	FACTOR	RESISTIVITY	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH
	NO.	FEET	OHMS	X	OHM-CM II	MHOS	MHOS	MHOS	X	OHM-CM	FEET
			========	=======================================	=======================================	=======================================	=======================================		=======================================	=======================================	
	4	5'- 3"	229	1000	228571	0.0044	0.0044 1	228.5714	1000 [228571	0"-5'3"
	l.	1		1 .000		0.00.1	0.00.1		1		

0.0207

0.0560

0.1046

0.1560

96512 ||

53571 ||

38251 ||

32051 ||

2000 |

3000 |

4000 |

5000 |

48

18

10

6

DATE:

08/7/97

TESTER:

61.1700

28.3470

20.5882

19.4444

0.0163

0.0353

0.0486

0.0514

1000

1000

1000 |

IMPRESSED CURRENT GROUNDBED DESIGN CLAPP ST EASTHAMPTION

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(b) Page 1 of 2

Resistivity:

9300 ohm-cm

MATERIAL COST

 Anode Type:
 Anode:
 175 ea.

 Anode Dia:
 3 in.
 Anode Cbl:
 0.1 \$/ft

 Anode Length:
 120 in.
 Hdr Cbl:
 1.25 \$/ft

of Anodes: 11 Splice: 25

Anode Spcng 30 ft. INSTALLATION COSTS
Dist. Remote 1200 ft. Trenching: 2 \$/ft

Anode Inst: 240 per anode

SIZE Splc Inst: 15 per splice

Hdr Cable: 1 AWG Power Cost: 0.1 \$/kwh

Hdr Cable: 1 AWG Power Cost: 0.1 \$
Electric 0

wetland 1200
Operating I: 12 amps(est) permits 275

Operating I: 12 amps(est) permits 275 cops 0

GROUNDBED DESIGN RESULTS

Resistance: 2.97861 OHMS GROUNDBED COSTS

 Rect. Volts:
 35.7 volts
 Materials:
 \$6,715.00

 Est. Amps:
 9 amps
 Install:
 \$2,670.00

Total \$10,860.00

Header length 300

S OIL RESIS T IVITY SUR V EY & LAYER VALUE DETERMINATION

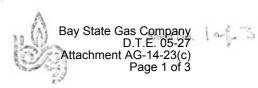
Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(b) Page 2 of 2

TOWN:	EASTHAMPTION	LOCATION:	CLAPP ST	DATE:	07/01/97	TESTER:	KS

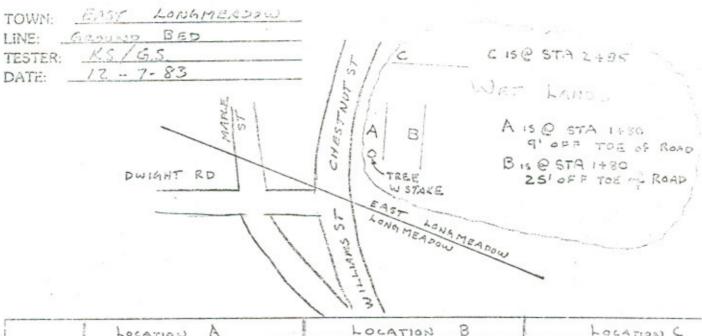
==								= 200200000			*
1			4 PIN DAT	A	11			LAYER	PROCEDUR	E	1.
=											= ====================================
i				1	ii		1	R2	1	LAYER R	E SISTIVITY
i	LOCATION	SPACING I	R1	FACTOR	RESISTIVITY	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH
i	NO.	FEET	OHMS	X	OHM-CM II	MHOS	MHOS	MHOS	X 1	OHM-CM	FEET
=						HORSESSEE.					= =====================================
i		2'- 7"	37	500	18500	0.0270	1	37.0000	500	18500	0-2'7"
i		5'- 3"	40	1000	40000 [0.0250	-0.0020	-493.3333	500	-246667	2"7"-5'3"
i		7'-10"	32	1500	48000 II	0.0313	0.0063	160.0000	500	80000	5'3"-7'10"
i		10'-6"	38	2000	76000	0.0263	-0.0049	-202.6667	500	-101333	7'10"-10'6"
i		13'-1"	32	2500	80000	0.0313	0.0049	202.6667	500	101333	10'6"-13'1"
i		15'-8"	25	3000	75000	0.0400	0.0088	114.2857	500	57143	13'1"-15'8"
i.		18'-3"	21	3500	73500 [0.0476	0.0076	131.2500	500	65625	15'8"-18'3"
i		20'-10"	15	4000	60000	0.0667	0.0190	52.5000	500	26250	18'3"-20'10"
i		23'-6"	11	4500	49500	0.0909	0.0242	41.2500	500	20625	20'10"-23'6"
i		26'-1"	9.5	5000	47500 II	0.1053	0.0144	69.6667	500	34833	23'6"-26'1"
i		28'-9"	7.5	5500	41250	0.1333	0.0281	35.6250	500	17813	26'1"-28'9"
i.		31'-3"	5.9	6000	35400 []	0.1695	0.0362	27.6563	500	13828	28'9"-31'3"
i		33'-11"	3.3	6500	21450	0.3030	0.1335	7.4885	500	3744	31'3"-33'11"
i		41'-9"	0.5	8000	4000 [2.0000	1.6970	0.5893	2000	1179	39'2"-41'9"
==						CODGUUNE		= ========			R BRIDGESSERES IN

S OIL RESIS T IVITY SUR V EY & LAYER VALUE DETERMINATION

	TOWN:	E/	ASTHAMPTIC	N	LOCATION:	CLAPP ST	DATE:	07/01/97	TESTER:	KS		
==		=										
1				4 PIN DAT A	\	11			LAYER	PROCEDURE		1
=	********	=					ORDERES T	*********	*********			
i		1	1	1	1	11	1	1	R2	- 1	LAYER R	E SISTIVITY
i.	LOCATION	i	SPACING	R1 I	FACTOR	RESISTIVITY	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH
i	NO.	i	FEET	OHMS	X I	OHM-CM	MHOS	MHOS	MHOS	X	OHM-CM	FEET
=		×										
i		1	2'- 7"	40	500	20000	0.0250	1	40.0000	500	20000	0-2'7"
i		i	5'- 3"	43	1000	43000	0.0233	-0.0017	-573.3333	500	-286667	2'7"-5'3"
i		i	7'-10"	35	1500	52500	0.0286	0.0053	188.1250	500	94063	5'3"-7'10"
i		i	10'-6"	42	2000	84000	0.0238	-0.0048	-210.0000	500	-105000	7'10"-10'6"
i		İ	13'-1"	35	2500	87500	0.0286	0.0048	210.0000	500	105000	10'6"-13'1"
i		i	15'-8"	28	3000	84000	0.0357	0.0071	140.0000	500	70000	13'1"-15'8"
i		i	18'-3"	24	3500	84000	0.0417	0.0060	168.0000	500	84000	15'8"-18'3"
i		i	20'-10"	18 [4000	72000	0.0556	0.0139	72.0000	500	36000	18'3"-20'10"
i		i	23'-6"	14	4500	63000	0.0714	0.0159	63.0000	500	31500	20'10"-23'6"
i	23	i	26'-1"	13	5000	65000	0.0769	0.0055	182.0000	500 [91000	23'6"-26'1"
i		i	28'-9"	8	5500	48000	0.1250	0.0481	20.8000	500	10400	26'1"-28'9"
i		i	31'-3"	6.9	6000	44850	0.1449	0.0199	50.1818	500	25091	28'9"-31'3"
1		i	33'-11"	5.2	6500	41600	0.1923	0.0474	21.1059	500	10553	31'3"-33'11"
i		İ	41'-9"	2	8000 8500	17000	0.5000	-0.3077	-3.2500	2000	-6500	39'2"-41'9"



CORROSION CONTROL SURVEY



SPACING	Loca	A GOIT		Lo	CATION	В	LOCATION C			
	MTR. READING	MULIT.	S.	MTR READING	×	N	MTR READING	×	S.	
2'-7"	0.14	100	14	0.13	100	13	0.15	100	15.0	
5'-2"	0.10	100	10	\$ 0.71	10	7.1	0.70	10	7.0	
7-9"	0.63	10	6.3	0.55	10	5,5	0.54	10	5,4	
10'- 4"	0.55	10	5.5	\$ 0.45	10	4.5	0,44	10	4.4	
12'-11"	0.49	10	4.9	0.42	10	4.2	0.39	10	3.9	
15'-6"	0.44	10	4.4	0.38	70	3.8	0,35	10	3.5	
									-	

		1		9
			-	
			Carrier and Carrie	
	-			
 -				

SOIL RESISTIVITY SURVEY & LAYER VALUE DETERMINATION

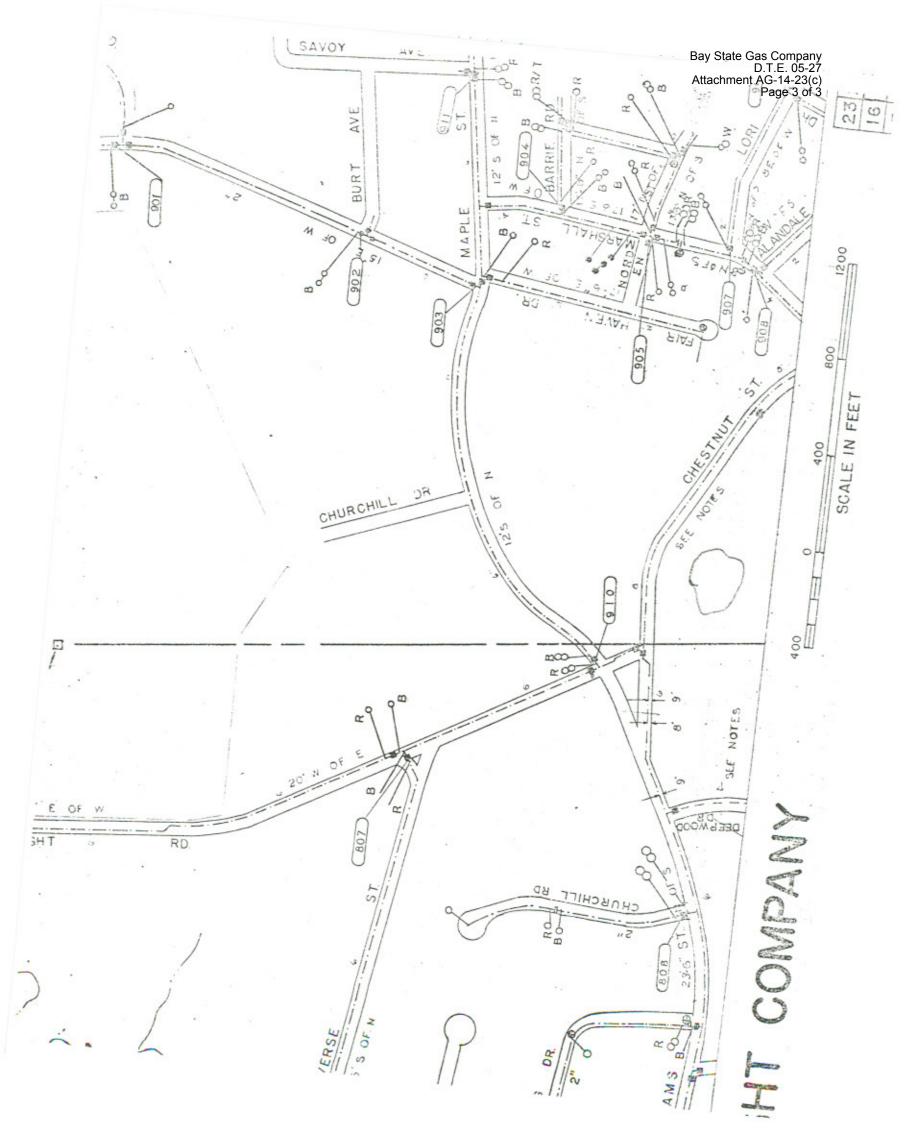
TOWN LONGMEADOW

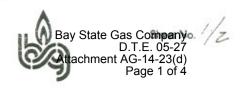
LOCATION WILLIAMS ST @ DUIGHT RD DATE DEC. 7, 1983 TESTER G.S.

CHESTNUT ST

K.S.

		4 PIN DA	TA					LAYER PRO	GEDURE	
Location No.	Spacing Feet	R ₁ ohms	Factor X	Resistivity ohm-Cm.	1/R ₁ Mhos	Δ1/R ₁ Mhos	R ₂ 1/Δ1/R ₁ Mhos	Factor X	Ra ohm-Cm.	Layor Dopth
ar afficiency delicates designates according	2'-7"	14	500	7000	.0714	-	14	500	7000	0'-2'-7"
A	5'-2"	10	1000	10000	.0100	.0614	16	500	8000	2'-7" - 5'-2"
	7'-9"	6.3 5.5	2000	9450	.1587	0231	43.3	500	3350	5'-2' -7'-9"
	12'-11"	4.19	2.500	12250	.2041	0223	44.9	500	22450	10'-4'-12'-11'
	15-6"	4.4	3000	13200	,2276	,0232	43.2	500	21600	12'-11"-15-6"
В	2-7"	13	500	6500	.0769		13	500	6500	0'- 2'-7"
	5'-2"	7.1	1000	7100	.1408	.0640	15.6	500	7800	2'-7"-5'-2"
	7'-9"	5.5	1500	82.50	.1818	,0410	24.4	500	12200	5'-2" - 7'-9"
	10'-4"	4.5	2000	9000	2222	.0404	2.4.7	500	12 350	7'-9"-10'-4
	12'-(1'	4.2.	2500	10500	.2381	.0159	62.9	500	31450	10'-4" 12:11
	15'-6"	3.8	3000	11400	.2632.	,0251	39,9	500	19950	12:-11"-15'-
C	2'-7"	15	500	7500	.0667		15	500	7500	0 - 2'-7"
	5'-2'	7.0	1000	7000	,1429	.0762	13,1	500	6550	2:-7"5-2
	7'-9"	5.4	1500	8100	.1852	,0423	23.6	500	11800	5 '-2" 7'-9
		4.4	2000	8800	. 2273	,04-21	23,8	500	11900	7-9"-10'-4
	10'-4"		2500	9750	.2564		34.4	500	17200	10:4"-12:-11
	1511,	3.9		10500	,2857	10293	34.1	500	17050	12'-11" - 15'-6
	15'-6"	3.5	3000	10300	12001	10 273	2411	C) WILLY	17550	1.5
		1								





CORROSION CONTROL SURVEY

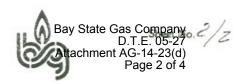
TOWN: EAST LONGMEADOW

LINE: PORTER RD.

TESTER: G.S., C.D., W.A.

DATE: 10-6-82

/	5t. 2-7		X	~	factor X	- R r/cm	
		.12	100	12	500	6000	
	5-2	.58	10	5.8	1000	5800	
	7-9	.55	10	5.5	1500	8250	
	10-4	.50	10	5.0	2000	10.000	
	12-11	. 46	10	4.6	2500	11,500	
2	2-7	./8	100	18	500	9000	
	5-2	.13	100	13	1000	13000	
	7-9	.89	10	8.9	1500	13.350	
	10-4	.82	10	8.2	2000	16,400	
	12-11	.72	10	7.2	2500	18000	
3	2.7	. 36	100	36	500	18000	
	5-2	.25	100	25	1000	25000	
	7-9	.18	100	18	1500	27000	
	10-4	.14	100	14	2000	28000	
	12-11	.89	10	8.9	2500	22250	
2	2-7	.52	100	52	500	26000	
	5.2	.29	100	29	1000	29000	
	7-9	.20	100	20	1500	30000	
	10-4	.16	100	16	2000	32.000	



CORROSION CONTROL SURVEY

TOWN: E. L.

LINE: Parter Rd

TESTER: G. 5. C.D. W.A

DATE: 10-6-82

LOC #	SPACING	Mtr. Rdg	Scale X	R	Sector	R			
5	£t. 2-7	.22	100	22	500	11000		+	
9	5-2		100	16	1000	16,000		1	
	7-9	.16	100	11	1500	21,000	-	1	
	10-4	.89	10	8.9	2000	17,800			
	12-11	.83	10	8.3	2500			1	
	16-11	.05	,,,	0.5	2500	4,150			
5	2-7	. 88	10	8.8	500	4400		-	
	5-2	,50	10	5.0	1000	5,000			
	7-9	.47	10	4.7	1500	7,050			
	10-4	.44	10	4.4	2.000	8800			
	12-11	.40	10	4.0	2500	10,000			
						1			-
		William III							

Bay State Gas Company D.T.E. 05-27 SOIL RESISTIVITY SURVEY & LAYER VALUE DETERMINATION Attachment AG-14-23(d) Page 3 of 4

TOWN EAST Longmandow LOCATION Porter Rd

DATE 10-6-82 TESTER C.

		4 PIN DA	TA					LAYER PRO	CEDURE	
	100 100000 Dec						Р.		LAYE	R RESISTIVITY
Location No.	Spacing Feet	R ₁ ohms	Factor X	Resistivity ohm-Cm.	1/R ₁ Mhos	Δ1/R ₁ Mhos	R ₂ 1/∆1/R ₁ Mhos	Factor X	R ₃ ohm-Cm.	Layer Depth Feet
/.	2-7 5-2 7-9 10-4 12-11	12 5.8 5.5 5.0 4.6	500 1000 1500 2000 2500	6000 5800 8250 10,000 11,500	0.083 0.172 0.182 0.200 0.217	0.089	12 11.2 100 56 59	500 500 500 500 500	6000 5600 50,000 28,000 29,500	0-2.7 27-5,2 5:2-7-9 7-9-10-4 10-4-12-11
2	2-7 5-2 7-9 10-4 12-11	18 13 8.9 8.2 7.2	500 1000 1500 2000 2500	9000 13000 13,350 16,400 18,000	0.056 0.077 0.112 0.122 0.139		18 48 29 100 59	500 500 500 500 500	9000 24,000 14,500 50,000 29,500	0 - 2.7 27 - 5-2 5-2 - 7-9 7-9 - 10-4 10-4 - 12-11
3	2-7 5-2 7-9 10-4 12-11	36 25 18 14 89	500 1000 1500 2000 2500	18,000 25000 21,000 28,000 22,250	0.028 0.040 0.056 0.071 0.112	0.012	36 83 63 67 24	500 500 500 500	18000 41,500 31,500 33,500 12,000	0-2-7 2-7-5-2 5-2-7-9 7-9-10-4 10-4-12-11
4	2-7 5-2 7-9 10-4 12-11 15-6	52 29 20 16 10 8.6	500 1000 1500 2000 2500 3000	26,000 29,000 30,000 32,000 25,000 25,800	0.050	0.015	52 67 63 77 63 77 63	300 300 300 300 300	26,000 33,500 31,500 38,500 13,500	0- 2.7 27-5.2 5-2-7-9 7-9-10.4 10.4-12.11 12.11-15.6

Bay State Gas Company / Z D.T.E. 05-27 Attachment AG-14-23(d) Page 4 of 4

SOIL RESISTIVITY SURVEY & LAYER VALUE DETERMINATION

TOWN East Longman basecation Corter Rd DATE 10.6-82 TESTER 65, CD, WA

		4 PIN DA	TA					LAYER PRO	CEDURE	
				_			R ₂		LAYE	ER RESISTIVITY
No.	Spacing Feet	R ₁ ohms	Factor X	Resistivity ohm-Cm.	1/R ₁ Mhos	Δ1/R ₁ Mhos	1/Δ1/R ₁ Mhos	Factor X	R ₃ ohm-Cm.	Layer Depth Feet
5	2-7	22	500	11.000	0.045		22	500	11,000	0-2.7
	5-2 7-9 10-4	16 14 8.9	1000 1500 2000	16,000 21,000 17,800	0.063		56 125 24	500 500 500	28,000 62,500 12,000	2-7-5-2 5-2-7-9 7-9-10-9
	12-11	8.3	2500	20,750		0.008	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	500	62,500	10.4-12-11
6	2-7 5-2 7-9 10-4 12-11	8.8 5.0 4.7 4.4 4.0	500 1000 1500 2000 2500	4400 5000 7050 8800 10,000	0.114 0.200 0.213 0.227	0.086 0.013 0.014 0.023		500 500 500 300 500	4400 6000 38,500 35,500	0- 2.7 27-5.2 5.2-7.9

Bay State Gas Company
D.T.E. 05-27 o

Attachment AG-14-23(e)
Page 1 of 2

CORROSION CONTROL SURVEY

TOWN:	E. 601	POMEA	Deur				- A/2 ±	
LINE:	OR C.P.	et 12	Outerbe	14.		a property of the second of th	AND THE COLUMN TWO THE COURT END	
TESTER: DATE: _	5-12-	78	1					
DAIL								
				DEN	scow Rd.			
	•		,		7 1			1 -
		10 retar			/ /			
		.68		1	1			Property
		A.	1	1.	a			Tool .
		10		L >SEW				5
		16	44'	N.W.	5			PRO
		4/	•	1 5				15 do
		7/1	7-1-2	1/5	The state of the s			į,
		*						
7	T T							
wel	a.	7	wen					
2-6	23	100	14000					
5-2	17	1000	12,600					
7-8	5.9	7000	11.800					
10-4	3.7	2000	12.00					
						-		

18: 4"	728.	Bay Atta	State (Gas Compan D.T.E. 05-2 t AG-14-23(e Page 2 of
6:0	7.1	12	00	RES.
0.1695	0.1408	0.0833	0.0357	"/RES
7.820.0	0.0575	0.0476	March (Color)	∆ '/RES. MHOS
N.	17.2	9.05	2.8	A RES.
Soc	560	500	500	X FACTOR
724,71	O COO	10,407	14,000	LAYER RES
1.8"-10:A"	52 7.8	2:2 - 5:2	0. 2.4	LAYER FT.

BUREL NE

S OIL RESIS T IVITY SUR V EY & LAYER VALUE DETERMINATION

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(f)

	TOWN:	EAST LONGM	EADOW	LOCATION:	SOMERS RD.	DATE:	12/22/87	TESTER:	GS/KS	Attachmer	nt AG-14-23(f) Page 1 of 1
==	========	= ========	= =========			=======================================	===========	=======================================	=======================================		
1			4 PIN DAT	4	11			LAYER	PROCEDURE		1
=	========	= =========	_ =========					=======================================	=======================================	==========	=======================================
1		1	1	1	ii ii	1	1	R2	1	LAYER R	E SISTIVITY
1	LOCATION	SPACING	R1	FACTOR	RESISTIVITY	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH
1	NO.	FEET	OHMS	X	OHM-CM	MHOS	MHOS	MHOS	X	OHM-CM	FEET
=		= =========							=======================================	=======================================	= =====================================
1		2'- 7"	74	500	37000	0.0135	1	74.0000	500	37000	0-2'7"
1		5'- 3"	17	1000	17000	0.0588	0.0453	22.0702	500	11035	2'7"-5'3"
1		7'-10"	7	1500	10500	0.1429	0.0840	11.9000	500	5950	5'3"-7'10"
1		10'-6"	6.7	2000	13400	0.1493	0.0064	156.3333	500	78167	7'10"-10'6"
1		13'-1"	5.9	2500	14750	0.1695	0.0202	49.4125	500	24706	10'6"-13'1"
1		15'-8"	0	3000	0	#DIV/0!]	#DIV/0!	#DIV/0!	500	#DIV/0!	13'1"-15'8"
İ		18'-3"	0	3500	0	#DIV/0!	#DIV/0!	#DIV/0!	500	#DIV/0!	15'8"-18'3"
1		20'-10"	0	4000	0	#DIV/0!	#DIV/0!	#DIV/0!	500	#DIV/0!	18'3"-20'10"
1		23'-6"	0	4500	0	#DIV/0!	#DIV/0!	#DIV/0!	500	#DIV/0!	20'10"-23'6"
1		26'-1"	0	5000	0	#DIV/0!	#DIV/0!	#DIV/0!	500	#DIV/0!	23'6"-26'1"

SOIL RESISTIVITY SURVEY & LAYER VALUE DETERMINATION

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(g)

TOWN Granby LOCATION New Ludlow Rd DATE 9-17-80 TESTER H. EVERET (ETONY BROOK-IN TOWN EASEMENT)

		4 PIN DA	TA					LAYER PROC	CEDURE	
Location No.	Spacing Feet	R ₁ ohms	Factor X	Resistivity ohm-Cm.	1/R ₁ Mhos	Δ1/R ₁ Mhos	R ₂ 1/Δ1/R ₁ Mhos	Factor X	R ₃ ohm-Cm.	R RESISTIVITY Layer Depth Feet
	2-7"	20	500	19000	.050	-	20	500	10,000	0-0-2-7
	5-2"	14	1000	14000	150.	150.	47.62	500	23809	2-7"-52
	7-9"	9.6	1500	14,400	.104	.033	30.30	500	15 150	5-2'-7-9
	10-4"	7.6	2000	15200	.132	850	35,71	500	17,850	1
	12-11	7.6	2500	19000	- 132			500		10-4-1211
ite#2			5							
	2-7"	40	500	20,000	.025	-	40	500	20,000	0-0-2-7
	5 2°	18	1000	18,000	1056	1031	32.26	500	16,129	2-7-5-2
	7-9"	12	1500	18,000	.083	.027	37.03	500	18,520	5-2'-7-9
	10-4"	8	2000	16,000	125	1042	23-81	500		7-9'-10-4
	12-11"	7	2500	17,500	.14-2	.017	58,82	500	29400	10-4"-12-11
									22	

Bay State Gas Company D.T.E. 05-27
Attachment AG-14-23(h)
Page 1 of 5

CORROSION CONTROL SURVEY

TOWN: LAMPOEL

LINE: 12"H-P. MILL Rd

TESTER: M.E., G.S. COA.

DATE: 5.10-78

Soil Ces Test

5-11-78

1) INSTALLED (3"die x 5" PIPE)

VERTICAL

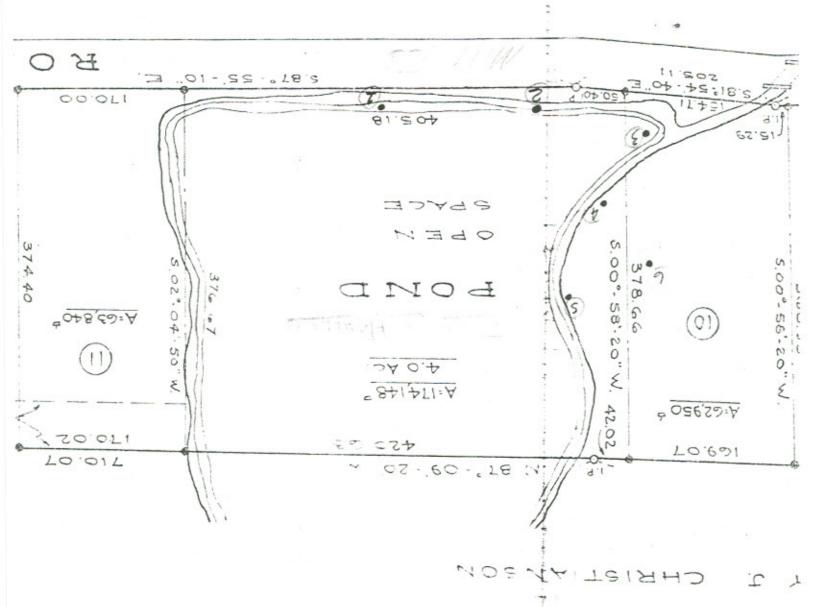
2) 100 ft = Al. Foic.

3) T/2 @ Pole #45

Loc.	Spacing	4	y	2/cm}	Luc	Spacing	~	~	-e/cm
1	2.6	7/	500	35,500	14	21.6	48	500	24000
	5.2	25 ×	1000	25.000		5-2	24	1000	24000
	7.8	19	1500			7-8	19	1500	
	10.4	16	2000	32,000		10-4	17	2000	34000
z)	2-6	120	500	60.00	· transmission - marks				
/	5.2	46 x	1000	46000					
	7-8	30	1500						
	10-4	23	2000	46,000					
									1

3)		~			:	1
	2-6	53	500	26,500		
	5-2	35 4	1000	35,000		
	7.8	28	1500			
-855 (LV-18	10-4	23	2000	46000		
4)	2-6	50	500	25,000		
	5-2	35 4	1000			
	1-8	30	1500	45000		
ń)	16-4	22	2000	44.000		
7	2-6	49	500	24,500		
	1-8	18 +	1000	28,000		
	10-4	28	2000	40.000		

5N 177	LAYER	Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(h) Page 2 of 5
LAURE 2	LAYER RES	24.000 24.000 24.000 24.000 24.000 24.000 24.000 24.000 25.000 25.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.000 26.0
_ DATE_	X FACTOR	8 18 18 18 18 18 18 18 18 18 18 18 18 18
2 / 1 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 /	A RES.	5. 16 5 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
LOCATION	D "/RES.	2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.
07	"/RES MHOS	7.3.9. 2.0.0.0. 2.0.0.0.0. 2.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0
HE	RES.	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
DISTRICT	W SPACING	



Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(h) Page 4 of 5

CORROSION CONTROL SURVEY

						5	ECT /	Vª Z	
LINE: TESTER: DATE: _			7						
/ 	Â			- F		. (1)		
32	2	\$ \$		4 1					
					14	73.			
					~~				
	£,	V/2	1 1/10		<i>-</i> 4	4.5	Vás	V4-	
4.70	5, 10 V 6. 4	7.0	10V 6.70 1.20		2.4.0	2.33	6.60	-:-30	
1.70			5.50		1.7		7,00	F (1)	
					1, 14 4	0.512		1.45 n	- 1
	3	7.27	11						
	1-	W	20				17:	1664	W- 3.14
	eli eli eli								
	8 1996	10.							
				14:TE	7.50	A 13 17 F	e Es	T. 50	ut. =
	, - :				TIED	will.			



CORROSION CONTROL SURVEY

I T I	INE: TESTER: DATE: _	HAMF 2 Della 5-11-1	Er Bu FWA 73)/ 01) 	15/16 14/11 = 0.0	4-0.	-Fical		
7.	EST	ented u	: LEA	D	/ 100 00	/ John Jing	y TGP		124.	/
		LOCAL.		OPEN	Bonsad.		135 G	M29 00+	TGP.	
	IR 1A 2.60	Vg1 2× 1.76	Vg4	Vg16	V316	0.52	V9 0.93	Vs.	Vg.	
	0	0.36	0.79	0.61	0.55	0.64	0.78	0.63	2.12	
	0.60	0.90	0.10	0.12	0.10	0.13	0.15	0.17	-0.02	
		2,			- 33			7	7, 2	
-		1					*/		-	
			2			-74			1	
		1 11							12	
				1-1		_	100			
F		-	1 128 5	1 -7 1-/1	<u> </u>		K. e.	14	3,	-
		012"71	21							
	EVE '	-	12.3		-,	7	- 13:50	· (4:	5 pg 310	7. 1.
- 1		-		Gia.	Liter)		4		7.5	1
12	·				915) ,			,	, ,
				2.3	21 7,29	-77	215) 5.5	(07.65	6.14
-		1.75,0	2		=		7.0			
			- ::=							
							- Mari	7		
		25	11, 2	7. 25						
						-				
	in a second	many 1 1 1 1	10 0				-	The same of the same		

4.4	(1 t) - (1 t)		
Cart x	718,	Bay State Attachme	Gas Company D.T.E. 05-27 nt AG-14-23(i) Page 1 of 1
25/54/6	200	000	RES.
200	0.030	0.008	"/RES
in the contract of the contrac	0.000	0.009	∆ '/RES. MHOS
bother	521	111	A RES.
	1000	0001	X FACTOR
		111,000	LAYER RES
	75-10-	2-6-5-5	LAYER

PHEE! NE

S OIL RESIS T IVITY SUR V EY & LAYER VALUE DETERMINATION

soilre22.wk4

TOWN: Longmeadow LOCATION: Middle school

DATE:

09/02/97

TESTER:

KS

	IOVV	N. L	ongmeadow		LOCATION.	Wilddle Scribbi	DATE.	03/02/37	ILOIEN.	NO			
==		=====					=============						==
1				4 PIN DAT A		11			LAYER	PROCEDURE			1
=	====	======	=======================================	=======================================		========	=======================================						=
1		1	1	1	1	ii ii	1	1	R2	1	LAYER R E	SISTIVITY	1
1	LOCA	I NOITA	SPACING	R1	FACTOR	RESISTIVITY	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH	İ
1	NO	. 1	FEET	OHMS	X I	OHM-CM	MHOS	MHOS	MHOS	X	OHM-CM	FEET	İ
=	====	=====				========							=
		1	2'- 7"	340	500	170000	0.0029	1	340.0000	500	170000	0-2'7"	1
1		1	5'- 3"	240	1000	240000	0.0042	0.0012	816.0000	500	408000	2'7"-5'3"	1
1		1	7'-10"	200	1500	300000	0.0050	0.0008	1200.0000	500	600000	5'3"-7'10"	1
1		1	10'-6"	170	2000	340000	0.0059	0.0009	1133.3333	500	566667	7'10"-10'6"	1
1		1	13'-1"	125	2500	312500	0.0080	0.0021	472.2222	500	236111	10'6"-13'1"	1
1		1	15'-8"	86	3000	258000	0.0116	0.0036	275.6410	500	137821	13'1"-15'8"	1
1		1	18'-3"	66	3500	231000	0.0152	0.0035	283.8000	500	141900	15'8"-18'3"	1
1		1	20'-10"	59	4000	236000	0.0169	0.0018	556.2857	500	278143	18'3"-20'10"	
		1	23'-6"	50	4500	225000	0.0200	0.0031	327.7778	500	163889	20'10"-23'6"	1
1		1	26'-1"	41	5000	205000	0.0244	0.0044	227.7778	500	113889	23'6"-26'1"	1
1		1	36'-7"	18	7000	126000	0.0556	0.0312	32.0870	2000	64174	26'-1"-36'-7"	1
			41'-9"	9.6	8000	76800	0.1042	0.0486	20.5714	1000	20571	36'-7"-41'-9"	
1		1	47'-0"	5.8	9000	52200	0.1724	0.0682	14.6526	1000	14653	41'-9"-47'-0"	1
1		- 1	52'-4"	3.5	10000	35000	0.2857	0.1133	8.8261	1000	8826	47'-0"-53'4"	1

IMPRESSED	CHIDDENIT	CROUNDE	ED DERICH
IMPRESSEU	CURRENT	GROUNDS	ED DESIGN

CABLE	RESIST	TANCE	TABLE
-------	--------	-------	-------

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(k) Page 1 of 1

Resistivity	16000 ohr	m-cm			Pioneer Drive	Longmeadow	ground bed					size r	resist		Att	achment	AG-14-23(k) Page 1 of 1
			MATERIAL (COST													
Anode Type:				Anode:	175	00.						0	9				
Anode Dia:	4 in.			Anode Cbl:	0.1	s/ft						1 1	p .				
Anode Length:	196 in.			Hdr Cbl:	1	S/R						2	#				
# of Anodes:	7			Splice:	20				175			3	ji				
Anode Spong	30 ft.		INSTALLATI	ION COSTS					280			4	#				
Dist. Remote	28 ft.			Trenching:	4.4	S/ft						5	7				
				Anode Inst:	3600							6	#				
	SIZE			Spic Inst:	15	per splice			38.910153			7	p.				
Hdr Cable:	0	AWG		Power Cost:	0.1	\$/kwh						8	,				
				Electric	1000							9	#				
Header length	476			Rectifier	1700												
				Repairs/parts	700												
Operating I:	5 am	ps(est)		permits/Eng.	1200							12	#				
			100	cops	0			3	SOIL RESITIVI	TY AND LAYE	R VALUE DE						
												16	#				
	GROUNDBED I	DESIGN	RESULTS							LOCATION:	LO	DATE:	11/9/1999	TESTER:	KES		
Resistance:	5.01624 OH	PMS.	100	GROUNDBED	COSTS												
Rect. Volts:	25.1 volt			Materials:	\$2,798.00				4 PIN DAT					LAYER	PROCEDURE	=	1
Est. Amps:	5 am			Install:	\$10,552.60												
and Faripoo.	0 411	-		Total	\$13,350.60									R2		LAVEDD	E SISTIVITY I
				rotai	913,300.60			SPACING	R1	FACTOR	RESISTIVIT	1 1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEF
			100	DRILLING				FEET	OHMS I	Y	OHM-CM	MHOS I	MHOS I	MHOS	Y	OHM-CM	
				DEPTH	35						- HERBERTS	=========				DIEST CON	n annananana al
			- 2	DEF III	90			5	52.5	957.5	50268.75		1	52.5000	957.5	50269	1 0-5
								10	20	1915	38300	0.0500	0.0310	32.3077	957.5	30935	5-10
	4.4	418559	VOLTAGE G	RADIENT AT	PIPE		7.77	15	10.1	2872.5	29012.25		0.0490	20.4040	957.5	19537	10-15
								20	6.5	3830	19150		0.0548	18.2361	957.5	17461	15-20
		5	GROUND BE	ED CURENT IN	N AMPS			25	5	4787.5	16756.25		0.0462	21.6667	957.5	20746	20-25
			RES. OHMS					30	3.5 [5745	14362.5		0.0857	11.6667	957.5	11171	25-30
		114	LENGTH AN	ODE IN FEET				35	2.5	6702.5	15415.75		0.1143	8.7500	957.5	8378	
		28	DISTANCE A	ANODE TO PIE	PE OR ?			40	2.3	7660	31789		0.0348	28.7500	957.5	27528	35-40
								45	4.15	8617.5	20682		-0.1938	-5.1595	957.5	-4940	40-45
								50	2.4	9575	22980	0.4167	0.1757	5.6914	957.5	5450	45-50
								55	1	10532.5	10532.5	1.0000	0.5833	1.7143	957.5	1641	50-55

CABLE RESISTANCE TABLE

si resist

0	0.1002
1	0.12640
2	0.15940
3	0.20100
4	0.25340
5	0.31960
6	0.40300
7	0.50810
8	0.64080
9	0.80800
1:	1.62000
1.	2.57600
10	4.09600

CURRENT GROUNDBED DESIGN FOR MORE THAN 410 WILLIAMS ST. WILLIAMS MIDDLE SCHOOL, LONGMEADOW

Header length

225

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(i) GB-LO.WK4

Resistivity:	14000 ohm-	cm					
						TOTAL	
		MAT	TERIAL COST			COST	
Anode Type:			Anode:	175	ea.	\$250.00	IN STOCK
Anode Dia:	3 in.		Anode Cbl:	0.1	\$/ft	\$32.00	IN STOCK
Anode Length:	120 in.		Hdr Cbl:		\$/ft	\$225.00	
			RECTIFIER	1100		\$1,100.00	
# of Anodes:	16		Splice:	15		\$400.00	
Anode Spcng	15 ft.	INS	TALLATION COSTS			,	
Dist. Remote	100 ft.		Trenching:	\$4.50	\$/ft	\$1,012.50	*
			Anode Inst:	\$300.00	per anode		
5	SIZE		Splc Inst:		per splice	\$425.00	
Hdr Cable:	1	AWG	Power Cost:	\$0.10	\$/kwh		
			Electric	\$850.00	4	\$850.00	*
			Rectifier	\$1,000.00		\$1,000.00	
Operating I:	16 amps	(est)	Conservation	\$0.00		\$1,200.00	
		()	PERMITS	\$500.00		\$500.00	
			COPS	\$0.00		\$350.00	
	GROUNDBED DE	ESIGN RES		40.00		******	
Resistance:	4.77431 OHM	S	GROUNDBED	COSTS			
Rect. Volts:	76.4 volts		Materials:	\$8,165.00			
Est. Amps:	10 amps	;	Install:	\$4,912.50			
Approximate Charles of products	500 S 500 S 500		Total	\$14,577.50		\$12,144.50	

DRILLING DEPTH

50 FEET

S OIL RESIS TIVITY SUR V EY & LAYER VALUE DETERMINATION

SOIL19.WK4

	TOWN:	S LONGMEAD	ow	LOCATION:	SCHOOL	DATE:	08/7/97	TESTER:	KS/GUS		
==		= =====================================									* ***********
_			4 PIN DAT		***********			LAYER	PROCEDURE		
_		1		1 1	- 1	I I	I I	R2	1		ESISTIVITY
	LOCATION	SPACING I	R1	FACTOR	RESISTIVITY II	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH
3	NO.	FEET	OHMS	I X		MHOS	MHOS I	MHOS	X	OHM-CM I	
				1	DIM-CM						
		5'- 3"	298	1000	297872	0.0034	0.0034	297.8723	1000	297872	
		10'-6"	136	2000 1	ma. a. m	0.0073	0.0034	251.7862	1000	251786	5'3"-10'6"
		15'-8"	77	3000		0.0073	0.0056		1000	177173	10'6"-15'8"
		20'-10"	49	1 4000	231250 197143	0.0130		177.1728 136.6702	1000	136670	15'8"-20'10"
							0.0073				
		26'-1"	28	5000	139456	0.0359	0.0156	64.2516	1000	64252	20'10"-26'1"
		31'-3"	16	1 6000	97674	0.0614	0.0256	39.1008	1000	39101	26'1"-31'3"
		36'-7"	11	7000	73684	0.0950	0.0336	29.7872	1000		31'3"-36'7"
		41'-9"	5	0008	42105	0.1900	0.0950	10.5263	1000		36'7"-41'9"
		47'-0"	5	9000	40602	0.2217	0.0317	31.5789	1000		41'9"-47'0"
	8.	53'-4"	3	10000	29851	0.3350	0.1133	8.8235	1000	8824	47'0"-53'4"
1	LOCATION	SPACING I	R1	I FACTOR I	RESISTIVITY II	1/R1 I	d1/R1	1/d1/R1	FACTOR I	R3 I	LAYER DEPTH
1		FEET			OHM-CM II	MHOS	MHOS I	MHOS I	X	OHM-CM I	
					=======================================					A 4	
		5'- 3"	320	1 1000	320000	0.0031	0.0031	320.0000	1000	320000	
		10'-6"	160	2000	320000	0.0063	0.0031	320.0000	1000		5'3"-10'6"
		15'-8"	76	3000 1	228000	0.0132	0.0069	144.7619	1000	144762	10'6"-15'8"
		20'-10"	51	4000	204000	0.0196	0.0064	155.0400	1000	155040	15'8"-20'10"
		26'-1"	30	5000	150000	0.0333	0.0137	72.8571	1000	72857	20'10"-26'1"
		31'-3"	19	6000	114000	0.0526	0.0193	51.8182	1000	51818	26'1"-31'3"
		36'-7"	13	7000 1	91000	0.0769	0.0243	41.1667	1000		31'3"-36'7"
		41'-9"	6	8000	46400 II	0.1724	0.0955	10.4722	1000		36'7"-41'9"
		47'-0"	4	9000	38700	0.2326	0.0601	16.6267	1000		41'9"-47'0"
		53'-4"	7	1 10000	36000	0.2326	0.0601	22,1143	1000		47'0"-53'4"
		55-4	,	10005.8	30000	0.2770	0.0452	22,1145	1000	1 11122	470-554
				10011.6 10017.4							
1				10023.2							
l	LOCATION	SPACING	R1	FACTOR	RESISTIVITY	1/R1	d1/R1	1/d1/R1	FACTOR	R3	LAYER DEPTH
	NO.	FEET	OHMS	X	OHM-CM	MHOS	MHOS	MHOS	X	OHM-CM	FEET
=											
		5'- 3"	240	1000	240000	0.0042	0.0042	240.0000	1000	240000	0"-5"3"
	i	10'-6"	170	2000	340000	0.0059	0.0017	582.8571	1000	582857	5'3"-10'6"
			86	3000	258000	0.0116	0.0057	174.0476	1000	174048	10'6"-15'8"
		15'-8"	80	0000							
		15'-8" 20'-10"	59	4000		0.0169	0.0053	187.9259	1000	187926	15'8"-20'10"
					236000 205000	0.0169	0.0053	187.9259 134.3889	1000	187926 134389	15'8"-20'10" 20'10"-26'1"
		20'-10"	59	4000	236000						
		20'-10" 26'-1"	59 41	4000 5000	236000 205000	0.0244	0.0074	134.3889	1000	134389	20'10"-26'1"
		20'-10" 26'-1" 31'-3"	59 41 19	4000 5000 6000	236000 205000 114000	0.0244 0.0526	0.0074 0.0282	134.3889 35.4091	1000	134389 35409	20'10'-26'1" 26'1"-31'3" 36'7"-41'9"

Bay State Gas Company D.T.E. 05-27 Attachment AG-14-23(m) Page 1 of 1